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EXAMINER

KRAVETS, LEONID

ART UNIT PAPER NUMBER

2189

DATE MAILED: 05/01/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/676,852

Applicant(s)

SPEAR ET AL.

Examiner

Leonid Kravets

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 02 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14-25, 27-39, 41 is/are rejected.
- 7) ☒ Claim(s) 13, 26, 40 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 February 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

***DETAILED ACTION***

***Drawings***

1. The previous objection to the drawings is withdrawn due to amendment filed February 2, 2006.

***Claim Objections***

2. The previous objection to claim 22 is withdrawn due to amendment filed February 2, 2006.

***Claim Rejections - 35 USC § 112***

3. The previous rejection of claims 7, 20 and 34 is withdrawn due to amendment filed February 2, 2006.
4. The previous rejection of claims 10, 23 and 37 is withdrawn due to amendment filed February 2, 2006.
5. The previous rejection of claims 11, 24 and 38 is withdrawn due to amendment filed February 2, 2006.
6. The previous rejection of claims 12, 25 and 39 is withdrawn due to arguments in amendment filed February 2, 2006.

7. The previous rejection of claims 13, 26 and 40 is withdrawn due to arguments in amendment filed February 2, 2006.

***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-4, 9, 10, 15-17, 23, 25, 28-31, 36 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnon (US Patent 6,493,796), and further in view of Micka (US Patent 5,657,440).

As per claim 1, Micka and Arnon disclose a method for forming a consistency group of data, comprising:

Arnon discloses providing information on a consistency group relationship indicating a plurality of slave controllers (Arnon, Fig 3, Ref 304a, b; Fig 5) and,

Micka further discloses for each indicated slave controller, [[a]] an indicated portion of a slave storage unit managed by the slave controller (Micka, Col 6, Lines 7-13),

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Arnon discloses the method wherein the slave storage controllers indicated in the consistency group transmit data from the indicated portions of their respective slave storage units consistent as of a point-in-time (Arnon, Col 8, Lines 14-19);

Arnon further discloses transmitting a command to each slave controller in the consistency group relationship to cause each slave controller to transmit data in the portion of the slave storage unit to a remote storage in a manner that forms the consistency group (Arnon, Col 9, Lines 57-66); and

determining whether all the slave controllers successfully transmitted the data in the portions of the slave storage units that is part of the consistency group to the remote storage (Arnon, Col 2, Lines 52-59).

As per claim 15, please see rejection of claim 1 above.

As per claim 28, please see rejection of claim 1 above.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the slave controllers of Micka into the system of Arnon, since Micka and Arnon form the same field of endeavor, namely data backup and this would allow for copying from one set of multiple DASD systems at one location to a second set of multiple DASD systems at another location through independent links (Micka, Col 2, Lines 50-55).

As per claim 2, Arnon and Micka disclose the method of claim 1. Micka further discloses the method wherein the remote storage is located at a remote site (Col 4, Lines 5-6) and wherein each slave storage unit is stored within a storage system attached to one slave controller (Micka, Fig 2, Ref 12).

As per claim 3, Arnon and Micka disclose the method of claim 1, wherein the operations of providing information on the consistency group relationship, transmitting the commands to each slave controller, and determining whether all the slave controllers successfully transmitted the data in the slave storage units to form the consistency group are performed by a master controller in data communication with the slave controllers. [In the system of Micka, the host and controllers share the responsibilities of transmitting commands to each slave controller, and determining whether all the slave controllers successfully transmitted the data in the slave storage units to form the consistency group (Micka, Col 6, Lines 7-13). Micka further discloses a primary controller for clocking and as a checkpoint message source (Micka, Col 3, Lines 5-11). According to the MPEP, making a device integral does not create a patentably distinct invention §2144.04].

As per claim 4, Arnon and Micka disclose the method of claim 3, Micka further discloses the method wherein the master controller also comprises one slave controller managing one slave storage unit including data to transmit to the remote storage [Micka discloses a primary controller, managing one slave storage unit including data to

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transmit to the remote storage. The integrated controller of claim 3, would serve the same function, in Fig 2, Ref 12 controls Ref 14.]

As per claim 9, Arnon and Micka disclose the method of claim 1, Micka further discloses the method wherein the remote storage comprises a plurality of remote storage systems (Micka, Fig 2, Ref 14), wherein each remote storage system is coupled to one or more remote storage controllers [each DASD system has a storage and a controller], wherein each slave controller transmits data to one or more remote storage controllers to store the slave storage unit data in the remote storage system coupled to the remote storage controller [In Fig 2, Ref 12' transmits to ref 14' coupled to it], and wherein each storage unit comprises a volume of data (Micka, Col 4, Lines 36-40).

As per claim 10, Arnon and Micka disclose the method of claim 1, Micka further discloses the method comprising:

copying data from local controllers to the slave controllers to store in the slave storage units, wherein the local controllers and slave controllers are at different geographical sites [The local controller interpreted as the host of Micka, is a different system than the DASD system, thus it is at a different geographic location] and the remote storage is at a remote geographical location with respect to the geographical sites including the local and slave controllers (Micka, Col 4, Lines 5-6).

As per claim 11, Micka and Arnon disclose a method for forming a consistency group, comprising:

Micka discloses receiving a command from a master controller to generate a first data structure to indicate updates to a slave storage unit (Micka, Fig 3, Step 104) to form a consistency group initiated by the master controller [The communication of Micka to write from the slave controllers to backup in sequence is interpreted as the generating a data structure indicating updates to the slave to form a consistency group since the claim does not anywhere mention the transfer happens simultaneously. The transfer of data can occur in any order, and the slaves sending data to the controllers forms the consistency sets, consistent as of a point in time as described by Arnon], wherein data in the slave storage unit in the consistency group is transmitted consistent as of a point-in-time (Arnon, Col 8, Lines 14-19);

generating the first data structure in response to the command (Micka, Fig 3, Step 104);

transmitting complete to the master controller after generating the first data structure (transmitting complete is obvious, creation of a data structure must be acknowledged in order to verify completeness);

copying updated data in the slave storage unit indicated in a second data structure to the remote storage, wherein the data is copied to form the consistency group [Second data structure is interpreted as a separate DASD subsystem in Figure 2 (Micka, Fig 3, Step 106). Examiner points out that the updated data must be copied to the backup as the system of Micka copies updates from the controllers to the backup



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system, and thus the updated data would be copied in the next update], wherein updates to the slave storage unit received while copying the updated data indicated in the second data structure to form the consistency group are indicated in the first data structure [Arnon discloses consistency sets among various mirroring groups, thus the second DASD of Micka would be indicated in a table (Fig 5) of the first DASD and thus the updates are indicated in the first data structure]; and

transmitting complete to the master controller after successfully copying the data in the slave storage unit indicated in the second data structure to the remote storage (transmitting complete is obvious, creation of a data structure must be acknowledged in order to verify completeness).

As per claim 16, please see rejection of claim 3 above.

As per claim 17, please see rejection of claim 4 above.

As per claim 23, please see rejection of claim 10 above.

As per claim 24, please see rejection of claim 11 above.

As per claim 38, please see rejection of claim 11 above.

As per claim 29, please see rejection of claim 2 above.

As per claim 30, please see rejection of claim 3 above.

As per claim 31, please see rejection of claim 4 above.

As per claim 36, please see rejection of claim 9 above.

As per claim 37, please see rejection of claim 10 above.

9. Claims 5, 18 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Micka in view of Arnon as applied to claims 1, 15 and 28 above, and further in view of Rangan (US PG-Pub 2004/0148376).

As per claim 5, Micka and Arnon disclose the method of claim 1, wherein each slave controller maintains a first data structure indicating updated data in the slave storage unit, wherein the slave controller transmits data in the slave storage unit indicated in the first data structure to the remote storage, further comprising:

Micka and Arnon do not disclose transmitting a command to each slave controller to cause the slave controller to generate a second data structure to indicate any writes received to the slave storage unit during the transmittal of data in the slave storage unit indicated in the first data structure to the remote storage.

Rangan discloses that in order to keep snapshots of a file at any point in time, it is necessary to write updates to the file to a different data structure (Page 8, Paragraph 155).

As per claim 18, please see rejection of claim 5 above.

As per claim 32, please see rejection of claim 5 above.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the data structure for write updates of Rangan into

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the system of Micka and Arnon, since Micka, Arnon and Rangan form the same field of endeavor, namely data back up and this would allow for snapshots that are up to date at any point of time (Rangan, Paragraph 155, Line 5).

10. Claims 6, 19 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Micka in view of Arnon as applied to claims 1, 15 and 28 above, and further in view of Hart (US Patent 6,957,221).

As per claim 6, Micka and Arnon disclose the method of claim 1, further comprising: Micka does not disclose transmitting a command to each slave controller to cause each slave controller to initiate an operation to cause the data from the slave storage unit at the remote storage to be copied to a remote backup storage after determining that all the slave controllers have successfully transmitted the data in the slave storage units to the remote storage.

Hart discloses transmitting a command to each slave controller to cause each slave controller to initiate an operation to cause the data from the slave storage unit at the remote storage to be copied to a remote backup storage after determining that all the slave controllers have successfully transmitted the data in the slave storage units to the remote storage [Primary disk database transmits data to a secondary backup system, making the secondary backup database disk show consistency with the primary database. After this action, a disk mirroring system is used to copy database data from the secondary backup system onto an auxiliary database disk (Col 4, Lines 40-49).

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While the system of Hart discloses a single system, it would have been obvious to one of ordinary skill in the art to use the backup of Hart in multiple storage units].

As per claim 19, please see rejection of claim 6 above.

As per claim 33, please see rejection of claim 6 above.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate copying data from the slave storage unit at the remote storage to a remote backup storage of Hart into the system of Micka and Arnon, since Micka, Arnon and Hart form the same field of endeavor, namely data backup and this would allow for extra backup (Hart, Col 4, Line 50).

11. Claims 7, 20 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Micka in view of Arnon and Hart as applied to claim 6, 15 and 28 above, and further in view of Kori (US Patent 6,836,844).

As per claim 7, the combination of Micka, Arnon and Hart disclose the method of claim 6, further comprising:

determining whether the data from the slave storage units at the remote storage were successfully copied to the backup remote storage [Hart suggests the backup can be used for backup certification and data warehousing, thus the backup must be successfully copied to be useful in those endeavors (Col 4, Lines 48-51)]; and

Hart does not disclose transmitting a command to each slave controller whose slave storage unit data was successfully copied to the remote backup storage to undo the copying of the slave storage unit data from the remote storage to the remote backup storage in response to determining that the data from the slave storage units at the remote storage were not successfully copied to the remote backup storage.

Kori discloses transmitting a command to each slave controller whose slave storage unit data was successfully copied to the remote backup storage to undo the copying of the slave storage unit data from the remote storage to the remote backup storage in response to determining that the data from the slave storage units at the remote storage were not successfully copied to the remote backup storage [See 112 rejection for claim 7 for interpretation of undo (Col 15, Lines 17-21)].

As per claim 20, please see rejection of claim 7 above.

As per claim 34, please see rejection of claim 7 above.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate undoing a bad copy of Kori into the system of Micka Arnon and Hart since Micka, Arnon, Hart and Kori form the same field of endeavor, namely copying of data and this would allow for invalidation of a failed copy for user advantage (Col 15, Lines 19-21).

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12. Claims 8, 21 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Micka in view of Arnon and Hart as applied to claims 6, 19, 33 above, and further in view of Cochran (US Patent 6,907,505).

As per claim 8, Micka, Arnon and Cochran disclose the method of claim 6; however they do not disclose the method wherein the copy operation from the remote storage to the remote backup storage comprises a virtual copy operation.

Cochran discloses using a virtual copy operation from a remote storage to a remote backup storage (Col 5, Lines 31-46).

As per claim 21, please see rejection of claim 8 above.

As per claim 35, please see rejection of claim 8 above.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the virtual copy of Cochran into the system of Micka, Arnon and Hart, since Micka, Arnon Hart and Cochran form the same field of endeavor, namely backup of data and this would allow for less allocation of internal resources (Cochran, Col 5, Lines 48-51).

13. Claims 14, 27 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Micka in view of Arnon as applied to claim 11, 24 and 38 above, and further in view of Dang (US Patent 6,718,352).

As per claim 14, Micka and Arnon disclose the method of claim 11. Micka and Arnon do not disclose the method further comprising:

queuing updates to the slave storage unit received while generating the first data structure (Dang teaches at Col 7, Lines 45-50);

Deng applying the updates to the slave storage unit after generating the first data structure (Dang teaches at Col 7, Line 66 – Col 8, Line 2); and

indicating the queued updates applied to the slave storage unit in the first data structure [Dang discloses copying the updates to the mirrored data set, thus the updates must be indicated in the first data set (Col 8, Lines 3-10)].

As per claim 27, please see rejection of claim 14 above

As per claim 41, please see rejection of claim 14 above.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the queuing and updating of updates of Dang into the system of Micka and Arnon, since Micka, Arnon and Dang form the same field of

endeavor, namely data backup and this would allow for data to be updated so it is exactly the same in one set as it is in the other set (Dang, Col 8, Lines 7-10).

### ***Response to Arguments***

14. As per the argument under heading Claims 5, 18 and 32 are Patentable Over the Cited Art, Examiner fully considered the argument, but disagrees. Applicant argues that Rangan does not "teach or suggest that a master controller transmits commands to slave controllers to generate a second data structure...". Examiner points out that nowhere within claim 5 is there disclosed a master controller transmitting commands to a slave controller. Thus the rejection is maintained

15. As per the argument under heading Claims 6, 13, 19, 26, 33 and 40 are Patentable Over the Cited Art, Examiner disagrees with the Applicant's argument with respect to claims 6, 19 and 33. Applicant argues that Hart does not disclose that the copy to the third location is requested by a master controller. No master controller is claimed within claim 6. Thus, rejection is maintained

16. As per the argument under heading Claims 7, 20 and 34 are Patentable Over the Cited Art, Examiner disagrees. Applicant argues that the cited art does not "teach or suggest reversing the copying if the slaves were not successful". Hart discloses invalidating a failed copy, this is equivalent to reversing the copying since invalidating the failed copy would inherently force the next oldest copy to be the backup copy. Thus,



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Hart discloses a command that reverses copying of a failed copy. Though Hart deals with only one such unit, it would be obvious that if multiple slave controllers fail in copying, each of their data must be invalidated.

***Allowable Subject Matter***

17. Claims 13, 26 and 40 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

18. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonid Kravets whose telephone number is 571-272-2706. The examiner can normally be reached on Mon-Fri 8-430.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reginald Bragdon can be reached on 571-272-4204. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Leonid Kravets  
Patent Examiner  
Art Unit 2189



REGINALD G. BRAGDON  
PRIMARY EXAMINER

April 13, 2006